UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,107	08/24/2004	Charles Steven Korman	148263-1	5106

6147 7590 09/24/2007

GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER	
HALL, ASHA J	

ART UNIT	PAPER NUMBER
1753	

MAIL DATE	DELIVERY MODE
09/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/711,107	KORMAN ET AL.	
	Examiner	Art Unit	
	Asha Hall	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *August 24, 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable by Konold (US 6,630,622) in view of Inoue (US 5,480,494).

With respect to claim 1, Konold discloses structural building component for a residential or light commercial building (col. 2; lines: 66-67) comprising: a PV laminate (201); and a frame (407) as shown in Figure 4 disposed at least around said PV laminate (201, 401) as shown in Figure 2 and 4, said frame (407) including a first electrical connector for communication with said PV laminate (401) and receptive to electrical connection with a contiguous PV laminate (col.5; lines; 42-46), said first electrical connector configured to facilitate electrical and mechanical connection with said contiguous PV laminate (col.5; lines; 42-46), said frame having a means connected to electrical junction box and conduit elbow fitting (202) for facilitating attachment to the building structure as shown in Figures 2 and 5-8 (col.5; lines; 42-54). However, Konold fails to disclose a plastic frame.

Inoue discloses a solar cell module (col. 1; lines: 42-47) and further discloses materials for the frame such as metal, plastic, and wood (col.1; lines: 48-54). Inoue teaches that the frame material should have a sufficiently great mechanical strength to

support a great weight of the solar cell module. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the plastic frame as taught by Inoue to the photovoltaic (PV) laminate device of Konold in order to have a sufficiently great mechanical strength to support a great weight of the solar cell module.

In regard to claim 2, modified Konold discloses component of claim 1, wherein said means bolts/rivets for facilitating attachment to the building structure as shown in (col.4; lines; 44-51) includes: a plurality of slots/holes configured in the frame receptive to a fastening means/bolts/rivets and a keyed channel/L-channels configured (col.4; lines: 44-51) in the frame receptive to a batten/bottom cover plate (406) (col.5; lines: 34-37).

With respect to claims 3 and 4, modified Konold discloses component of claim 1, wherein said frame (407) includes a heat sink structure/radiator embedded (col.2; lines: 13-15) and convective channels/copper tubing heat exchangers (404) in thermal communication with the electrical connector (col.5; lines: 37-42), said electrical connector providing a thermal conduit/conduit elbow (402) to an edge defining said PV laminate (col.5; lines: 42-54) where said one of said heat radiators/heat transfer unit – liquid inlet and outlet (and convective channels/heat exchanger channels(404) are disposed (Figure 4).

In regard to claim 5, modified Konold discloses the component of claim 4, wherein said one of the heat radiators/heat exchangers(404) (col.5; liens: 34-36) and convective channels/L-shaped channels are insert molded with the frame (407) (col.4 lines: 44-51).

With respect to claim 6, modified Konold discloses the component of claim 1, wherein said PV laminate and the frame is a PV roofing tile for a residential or light commercial rooftop (col.2; lines: 66-67).

3. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable by Konold (US 6,630,622) and Inoue (US 5,480,494) as applied to claim 1 above, and in further view of Middelman et al. (US2003/0160243).

With respect to claims 7 and 8, modified Konold discloses component of claim 1, discloses a substrate (col.4; lines: 38-39) and the frame (col. 4; lines: 49-51) disposed at least around said PV laminate, but fails to disclose that it is disposed on a polymer/ thermoplastic composite substrate sheathing, the polymer/thermoplastic substrate receptive to direct installation on a rafter/roof board.

Middelman et al. discloses a photovoltaic layer (paragraph 2) and further discloses solar cell sheet with a thermoplastic substrate with the preference of it being flexible to be applied to tiles, roofing sheets (paragraph 43-44). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the substrate of a thermoplastic material as taught by Middelman et al. to the modified photovoltaic device of Konold in order for the substrate to be flexible and applied to tiles and roofing sheets.

4. Claims 9-11 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable by Konold (US 6,630,622) and Inoue (US 5,480,494) as applied to claim 1 above, and in further view of Anderson et al. (5,008,062).

In regard to claims 9 and 10, modified Konold discloses component of claim 1, but fails to disclose wherein the frame is one of injection molded around a completed PV laminate and separately molded before integrating with said completed PV laminate and a sealing member, wherein the sealing member integrates at least one of electrical features, mechanical features, or weatherproofing features that simplify the interconnection of a plurality of PV laminates.

Anderson et al. discloses a photovoltaic module (14) (Figure 1) encapsulated in an injection molded frame (16) (col.3; lines: 7-22). Anderson et al. further teaches that the separately injection molded the material (col.2; lines: 60-67) and then injection molding the plastic frame around the laminate (col.3; lines: 55-59) is advantageous since it encapsulates the photovoltaic panels and the injection molded material is a thermosetting polymer such that is prevents heat damage to the thin film solar cell material while injection molded material is applied to the PV cells, and the injection molded frame permits the insertion of various sealing member/fasteners (which is a mechanical feature) (col.4; lines; 3-16) to connect a plurality of PV laminates (col.4; lines: 4-6). Also, Anderson et al. discloses that the encapsulated elastomer tapers outwardly form the panel to permit rainwater or condensation (weatherproofing features) to drain easily from the front panel (col. 4; lines: 65-68). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the frame by injection molding a thermoset polymer elastomer sealant around the PV laminate as taught by Anderson et al. to the PV laminate device of modified Konold in order to

encapsulate the photovoltaic panels from rainwater and mechanically bond with the use of fasteners.

In regard to claims 11 and 13, modified Konold discloses the component of claim 10, and discloses a snap-fit/fastenings/mechanical communication of the collector panel frame (col.4; lines: 49-51). However, Konold fails to disclose wherein the sealing member includes a second electrical connector for electrical communication with said first electrical connector and is an elastomeric seal configured to accommodate sealing between the plastic frame and said PV laminate.

Anderson et al. discloses a photovoltaic module (14) (Figure 1) encapsulated in an elastomer/plastic injection molded frame (16) (col.3; lines: 7-22) that seals the frame and the laminate/photovoltaic module (col. 3; lines: 13-22) and further discloses the sealing member/elastomer (30) as shown in figure 2 including a second electrical connector/external portion/wires (70) extend from the elastomer sealing member (30) (col.4; lines: 59-64) for electrical communication with the first electrical connector (68). Anderson et al. teaches that the external electrical connection, which extends form the elastomer for connection to an external electrical circuit for the utilization of the current produced by the photovoltaic module (col.4; lines: 60-64). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the external electrical connection for electrical communication as taught by Anderson et al. to the modified photovoltaic laminate of Konold in order to connect to an external circuit for the utilization of the current produced by the photovoltaic module.

With respect to claim 14, modified Konold discloses the component of claim 1, wherein said PV laminate includes: a plurality of solar cells (col.3; lines; 10-14) each having a first side and a second side (401) as shown in Figure 4, each of said plurality of solar cells configured to produce an electrical current (col.5; lines: 42-46) when receiving photons on at least said first side/Fresnel lens provided to receive the insolation (col.2; lines; 39-43); a translucent encapsulant/Fresbnel lens (409) operably coupled to the first side as shown in Figure 4 of each of said plurality of solar cells(col. 2; lines: 32-38); an insulative substrate /foam insulation (405)disposed on the second side of each of said plurality of solar cells and the insulative substrate/foam insulation (405) includes the plastic frame (407) (Figure 4); and electrical interconnects/electrical junction box (402) as shown in Figure 4. Konold also discloses electrical (811) and thermal communication/temperature sensor (809) with electrical interconnect (such as controller device, 811) (Figure 8) (col.5; lines: 48-51).

However, modified Konold fails to disclose the first electrical connector in electrical and thermal communication with electrical interconnects.

Anderson et al. discloses a photovoltaic module (14) (Figure 1) encapsulated in an elastomer/plastic injection molded frame (16) (col.3; lines: 7-22) that seals the frame and the laminate/photovoltaic module (col. 3; lines: 13-22) and further discloses as shown in Figure 2 the first electrical connector/external portion/wires (68) extending from the elastomer sealing member (30) for electrical communication (col.4; lines: 59-64). Anderson et al. teaches that the external electrical connection, which extends form the elastomer for connection to an external electrical circuit for the utilization of the

current produced by the photovoltaic module (col.4; lines: 60-64). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the external electrical connection for electrical communication as taught by Anderson et al. to the modified photovoltaic laminate of Konold in order to connect to an external circuit for the utilization of the current produced by the photovoltaic module.

In regard to claim 15, modified Konold discloses the method of claim 14, and further discloses the insulative substrate/foam insulation (405) includes the frame (407) (Figure 4).

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable by Konold (US 6,630,622), Inoue (US 5,480,494), and Anderson et al. (5,008,062) as applied to claim 11 above, and in further view of Stern et al. (US2003/0034062).

With respect claim 12, modified Konold discloses the component of claim 11, but fails to disclose wherein said sealing member is configured to shield joining edges of contiguous plastic framed PV laminates from the environment.

Stern et al. discloses a photovoltaic array (100) (paragraph 3) and further discloses a sealing member/edge clips (114) to shield the joining edges of the framed PV laminate (100) and improve on the grounding performance (paragraph 21 and 23). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the edge clips/sealing members that shield the edges of the framed PV laminate as taught by Stern et al. to the PV laminate device of modified Konold in order to improve on the grounding performance.

6. Claim 16, 17, 19, 20, and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable by Konold (US 6,630,622) and in view of Anderson et al. (5,008,062).

With respect to claim 16, Konold discloses a method to form an integrated PV laminate and frame for a structural building component (col.2; lines: 66-67), and receptive to electrical connection with a contiguous PV laminate (col. 5; lines: 45-47); molding a heat sink structure/radiator embedded (col.2; lines: 13-15) in the frame (Figure 4), said heat sink (col. 5; lines; 43-54) in thermal communication/temperature sensor (809) with said first electrical connector/controller device (811) as shown in Figure 8; molding a snap-fit feature in the frame for interconnection with said contiguous PV tile (col.3; lines: 44-51); configuring a means for facilitating attachment to the building structure in said frame(col.3; lines: 44-51); and combining said frame with said PV laminate (col.3; lines: 44-51). Konold fails to disclose the method comprising: molding a first electrical connector in a plastic frame for communication with a PV laminate.

Anderson et al. discloses a photovoltaic module (14) (Figure 1) encapsulated in an elastomer/plastic injection molded frame (16) (col.3; lines: 7-22) that seals the frame and the laminate/photovoltaic module (col. 3; lines: 13-22) and further discloses the sealing member/elastomer (30) as shown in Figure 2 including a the first electrical connector (68) extend from the elastomer sealing member (30) (col.4; lines: 59-64) for electrical communication with. Anderson et al. teaches that the external electrical connection, which extends form the elastomer for connection to an external electrical circuit for the utilization of the current produced by the photovoltaic module (col.4; lines:

60-64). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the external electrical connection for electrical communication as taught by Anderson et al. to the modified photovoltaic laminate of Konold in order to connect to an external circuit for the utilization of the current produced by the photovoltaic module.

In regard to claim 17, modified Konold discloses the method of claim 16, wherein said means bolts/rivets for facilitating attachment to the building structure as shown in (col.4; lines; 44-51) includes: a plurality of slots/holes configured in the frame receptive to a fastening means/bolts/rivets and a keyed channel/L-channels configured (col.4; lines: 44-51) in the frame receptive to a batten/bottom cover plate (406) (col.5; lines: 34-37).

In regard to claim 19, modified Konold discloses the method of claim 16, but fails to disclose a molded sealing member, wherein the sealing member integrates at least one of electrical features, mechanical features, or weatherproofing features that simplify the interconnection of a plurality of PV laminates.

Anderson et al. discloses a photovoltaic module (14) (Figure 1) encapsulated in an injectionmolded frame (16) (col.3; lines: 7-22). Anderson et al. further teaches that the injection molding the plastic frame around the laminate (col.3; lines: 55-59) is advantageous since it encapsulates the photovoltaic panels and the injection molded material is a thermosetting polymer such that is prevents heat damage to the thin film solar cell material while injection molded material is applied to the PV cells, and the injection molded frame permits the insertion of various sealing member/fasteners (which

is a mechanical feature) (col.4; lines; 3-16) to connect a plurality of PV laminates (col.4; lines: 4-6). Also, Anderson et al. discloses that the encapsulated elastomer tapers outwardly form the panel to permit rainwater or condensation (weatherproofing features) to drain easily from the front panel (col. 4; lines: 65-68). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the frame by injection molding a thermoset polymer elastomer sealant around the PV laminate as taught by Anderson et al. to the PV laminate device of modified Konold in order to encapsulate the photovoltaic panels from rainwater and mechanically bond with the use of fasteners.

In regard to claims 20 and 24, modified Konold discloses the method of claim 16, and discloses a snap-fit/fastenings/mechanical communication of the collector panel frame (col.4; lines: 49-51). However, Konold fails to disclose wherein the sealing member includes a second electrical connector for electrical communication with said first electrical connector and is an elastomeric seal configured to accommodate sealing between the plastic frame and said PV laminate.

Anderson et al. discloses a photovoltaic module (14) (Figure 1) encapsulated in an elastomer/plastic injection molded frame (16) (col.3; lines: 7-22) that seals the frame and the laminate/photovoltaic module (col. 3; lines: 13-22) and further discloses the sealing member/elastomer (30) as shown in figure 2 including a second electrical connector/external portion/wires (70) extend from the elastomer sealing member (30) (col.4; lines: 59-64) for electrical communication with the first electrical connector (68).

Anderson et al. teaches that the external electrical connection, which extends form the elastomer for connection to an external electrical circuit for the utilization of the current produced by the photovoltaic module (col.4; lines: 60-64). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the external electrical connection for electrical communication as taught by Anderson et al. to the modified photovoltaic laminate of Konold in order to connect to an external circuit for the utilization of the current produced by the photovoltaic module.

With respect to claim 23, Konold discloses the method of claim 16, and further disclose a structural building component for a residential or light commercial building (col. 2; lines: 66-67).

In regard to claim 25, Konold discloses the method of claim 16, and further discloses the insulative substrate/foam insulation (405) includes the frame (407) (Figure 4).

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable by Konold (US 6,630,622) and Anderson et al. (5,008,062) as applied to claim 16 above, and in further view of Middelman et al. (US2003/0160243).

With respect to claims 18, modified Konold discloses the method of claim 16, discloses a substrate (col.4; lines: 38-39) and the frame (col. 4; lines: 49-51) disposed at least around said PV laminate, but fails to disclose that it is disposed on a polymer/ thermoplastic composite substrate sheathing, the polymer/thermoplastic substrate receptive to direct installation on a rafter/roof board.

Middelman et al. discloses a photovoltaic layer (paragraph 2) and further discloses solar cell sheet with a thermoplastic substrate with the preference of it being flexible to be applied to tiles, roofing sheets (paragraph 43-44). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the substrate of a thermoplastic material as taught by Middelman et al. to the modified photovoltaic device of Konold in order for the substrate to be flexible and applied to tiles and roofing sheets.

8. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable by Konold (US 6,630,622) and Anderson et al. (5,008,062) as applied to claim 20 above, and in further view of Stern et al. (US2003/0034062).

With respect claim 21, modified Konold discloses the method of claim 20, but fails to disclose wherein said sealing member is configured to shield joining edges of contiguous plastic framed PV laminates from the environment.

Stern et al. discloses a photovoltaic array (100) (paragraph 3) and further discloses a sealing member/edge clips (114) to shield the joining edges of the framed PV laminate (100) and improve on the grounding performance (paragraph 21 and 23). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the edge clips/sealing members that shield the edges of the framed PV laminate as taught by Stern et al. to the PV laminate device of modified Konold in order to improve on the grounding performance.

In regard to claim 22, modified Konold discloses the method of claim 20, but fails to disclose wherein the sealing member is an elastomeric seal configured to accommodate sealing between the plastic frame and said PV laminate.

Anderson et al. discloses a photovoltaic module (14) (Figure 1) encapsulated in an elastomer/plastic injection molded frame (16) (col.3; lines: 7-22) that seals the frame and the laminate/photovoltaic module (col. 3; lines: 13-22). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the sealing member as elastomeric seal as taught by Anderson et al. to the modified photovoltaic laminate of Konold in order to seal in the photovoltaic module.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asha Hall whose telephone number is 571-272-9812. The examiner can normally be reached on Monday-Thursday 8:30-7:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AJH
/AJH/

/Alexa Neckel/
ALEXA D. NECKEL
SUPERVISORY PATENT EXAMINER